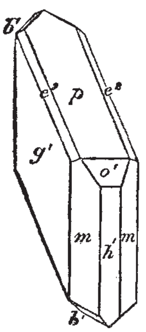
The raids of the Meenas into British territory brought matters to a crisis, and it became necessary to put them down. But in contrast with the unfortunate contests with savage races, which are going on at the present day in other parts of the world, it may not be unworthy of note that the tranquillisation of Jehazpoor was effected without a shot being fired.

CRYSTALLOGRAPHY

Crystals of Potassic Racemate



ACCORDING to De la Provostaye, potassic racemate crystallises in the rhombic system; but M. des Cloiseaux, in a communication to the Annales de Chimie (xvii. 365), disputes the truth of that statement. All the crystals with which he worked (some being presented to him by Pasteur, some by Lamy and Gernez), are really derived from an oblique rhomboidal prism of 96° 56′. The base of this prism is always highly developed, and its inclined diagonal makes an angle of 92° 28′ with the anterior vertical edge. The plane of the optic axes is perpendicular to the plane of symmetry; the acute bisectrix is negative and normal to g'. The *revolving* dispersion is considerable, as shown by the distance which separates the plane where the red axes are situated from that containing the blue. It is easily found by the polarising microscope across fine sections, normal to the acute bisectrix. The *proper* dispersion of the axes is rather strong, with $\rho < \nu$. For their apparent distance in air (at 19)

$$2E = 130\ 2' \text{ (red rays)};\ 132\ 45' \text{ (blue rays)}.$$

ZOOLOGY

Development of Molgula Tubulosa

IT is well known that the larvæ of the Ascidians generally possess a form resembling, in external appearance at least, that of the tadpoles of our common Frogs, and also resembling these in the agility with which they swim about by means of their tail-like appendage. In fact, as M. Lacaze Duthiers indicates in a paper just communicated to the Academy of Sciences, this peculiarity of development has for a long time been regarded as characteristic of all the Ascidians. According to the celebrated naturalist just mentioned, *Molgula tubulosa* forms an exception to this general rule. Instead of exhibiting the brisk, jerking movements of the embryos of the *Phallusiæ* for example, the embryo of *Molgula* moves very slowly within its egg-capsule, its movements consisting chiefly of alterations in its general form which, however, finally effect the rupture of the capsule. Through this opening the embryo *flows*, like a plastic, amœboid mass, which remains quietly at the bottom of the vessel, merely changing its form slowly by amœboid movements. Soon after exclusion the embryo shows indications of zones in its body, and from the outermost of these processes are given off (for some time only five in number), which seem to fix it to surrounding objects and are analogous to the innumerable filaments of the tunic in the adult.

SCIENTIFIC SERIALS

THE May number of Silliman's *American Journal of Science and Arts* (vol. xlix. No. 147) opens with a paper by E. W. Blake, jun., on a method of producing, by the electric spark, figures similar to those of Lichtenberg. His method consists in throwing the discharge upon the surface of a fusible non-conducting body, of which common pitch, coating a plate of tin, seems to furnish the best results. Figures produced by means of friction and induction sparks are represented by woodcuts. Col. J. J. Woodward publishes an important paper on the application of the magnesium and electric lights to photomicrography, illustrated with figures showing the arrangement of the apparatus. An anonymous writer, using the initials J. H. B. L., describes and figures a new form of mechanical finger for the microscope. The chemical papers are as follows:—Combinations of silicon with alcoholic radicals, by C. Friedal and J. M. Crafts, a long and valuable paper; analyses of meteoric irons, and remarks on the alkalies contained in leucite, by J. Lawrence Smith the first part of a memoir by B. Silliman and H. Wurtz, on flame temperatures in their relations to composition and luminosity; on some double sulphates of the Cerium group, by C. H. Wing; on two peculiar products in the nickel manufacture, by Joseph Wharton; two short notes by O. Loew, on the action of sunlight on sulphurous acid, and on the formation of ozone by rapid combustion; and two notes on methods to be adopted in gas-analyses by Dr. Wolcott Gibbs. Prof. Arthur Wright notices some curious phenomena observed by him in connection with the discharge of an electrical machine. Natural History proper is represented in this number only by two papers, namely, an account, by H. Y. Hind, of the Laurentian and Huronian series in Nova Scotia and New Brunswick, and descriptions of some new corals, by A. E. Verrill. The latter consist of four Alcyonaria and three Madreporaria, one of which is described as forming a new genus. Besides the usual abstracts and extracted articles placed under the head of Scientific Intelligence, the editors publish an extract from a letter describing the movements produced by a strong gale of wind in the great iron dome of the Capitol of Washington. This is illustrated by a tracing of the pencil mark showing the course of the movement of the centre of the dome.

THE *Revue des Cours Scientifiques* for June 4 gives us M. Berthelot's lecture "on the isomeric states of simple bodies," in which he treats especially of the different states of oxygen, and concludes by observing that there exists, at least in certain cases, a relation between the states of a simple free body (element) and the nature of the combination from which it has been separated; that a simple body in a certain condition can enter more easily into one class of combination than into another class; and that a simple body can change its condition even while it exists in certain combinations. We find also a continuation of M. Bernard's lectures on "Suffocation by the fumes of charcoal," and an address by M. C. Robin, entitled, "How the parts of an organism adapt themselves to determinate purposes." The number for June 11 is mainly occupied by the description of a contrivance by means of which a locomotive can be made to act as a drag or arrester of motion in the train, when such is the will of the driver. We have also a report of Prof. Helmholtz's lecture before the Society of Natural and Medical Sciences at Heidelberg, on "the physiological action of electric currents of short duration in the interior of extensive conducting masses."

THE *Journal of Botany, British and Foreign*, for June hardly sustains the interest of the earlier numbers of the new series. The original articles are confined to a continuation of the Hon. J. L. Warren's paper on the British *Rubi*, and of Mr. Worthington Smith's *Clavis Agaricinorum*, and an article of considerable interest to geographical botanists and theorists on the origin of species, "On the World-Distribution of the British *Caryophyllaceæ*," by Mr. J. G. Baker. We have besides a biography (with portrait) of the late Dr. Franz Unger, and some extracts and shorter notes.

THE best article in the May number of the *American Entomologist and Botanist*, is one which is neither entomological nor botanical, "On the Gordius or Hair-worm," by Prof. Jos. Leidy, of Philadelphia, giving an account of the anatomical structure of the animal, its mode of propagation, and of the different species found in the United States. There are several other articles and an abundance of shorter notes, that will be of value to the young naturalist.

THE *Geological Magazine* for June commences with an article by Prof. Harkness, on "Elephant-remains in Ireland," which have now been met with in several localities. The writer mentions incidentally that Ireland has afforded hitherto no traces of either the hyæna or lion; the pleistocene carnivora were confined to the bear, of which, however, there are no historical records, and the wolf, which was finally extirpated about the year 1710. Prof. de Koninck contributes a paper "On some new and remarkable Echinoderms from the British Palæozoic rocks, including a species of *Palæchinus*; a new species and new genus, *Placocystites Forbesianus*, belonging to the family of *Cystideæ*; and a new species of *Haplocrinus*, *H. granatum*." Mr. T. G. Bonney, "On supposed *Pholas*-burrows in Derbyshire," believes these burrows to have been made by a *Helix*. Mr. J. W. Laidlay describes a "Prehistoric Dwelling and Kitchen-midden on the Coast of Haddingtonshire," in which were found a very large quantity of rude pottery in fragments, and, for the most part, roughly moulded by the hands; a number of implements of bone, such as needles, arrowheads, combs, knives, chisels, &c.,

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very similar to those found in the Swiss lakes; a vast quantity of bones of oxen (of several varieties, including *Bos longifrons*), sheep, goats, deer, swine, dogs, &c.; of shells a great abundance, especially those of the *Patella* and *Liottrina;* a very rude querne, &c. They are considered to belong to an age as remote as the Roman period, or perhaps extending even beyond it. Mr. J. Croll concludes his account of "The Boulder-clay of Caithness, a product of land-ice," and Mr. C. Lapworth his valuable paper "On the Silurian rocks of Galashiels." Mr. Croll considers that nearly the whole of the North Sea, between Scandinavia and Scotland, was filled with glacier ice at the time of the formation of the boulder-clay of Caithness; and he indicates facts in the glaciation of the Orkney, Shetland, and Faroe Islands which certainly go a long way in support of his views. It is also to this enormous extension of ice that he ascribes that of the Locss, by the daming up of the waters of the Rhine and Elbe. Mr. Croll's paper is illustrated with a map.

Annales de Chimie et de Physique. April, 1870.—This number contains a long and valuable paper by M. Berthelot on the Varieties of Carbon. He commences by pointing out the specific heats of five different kinds of carbon, and comparing them with the specific heat of the element as deduced from that of its gaseous compounds, and shows that the relations between specific heat and atomic weight are not the same as those observed in the case of other elements. He then explains his process for distinguishing and separating the varieties of carbon by treatment with nitric acid and potassic chlorate, and describes the products obtained from carbons of different origin, enumerating no less than thirteen different varieties of the element. The next two sections describe the effects of various agents on carbon, and the carbon obtained from different compounds; concluding with the observation that the kinds of carbon differ so widely in their properties, re-actions, and specific heats as almost to warrant their being considered as different elements. The four following papers are also by M. Berthelot. The first is on the oxidation of hydrocarbons by a strong solution of chromic acid, under which circumstances ethylene produces aldehyde, propylene gives acetone, amylene forms complex bodies, probably derived from an acetone, acetylene produces carbonic, formic, and acetic acids, whilst from camphene camphor is obtained. The second describes a new synthesis of phenol, by treating acetylene with fuming sulphuric acid, thus preparing acetyleno-sulphuric acid and decomposing the potassium salt with fusing potassic hydrate. It appears that at the moment of the liberation of the acetylene from the sulpho-salt three molecules condense and oxidise at the same time. The third paper is on the action of potassic hydrate on the sulphuric derivatives of the hydrocarbons, in which the author describes the products obtained from several of the sulpho-acids. He endeavoured to prepare methylene from sodic formeno-sulphate, but without success, and in consequence of the numerous experiments which he has made he thinks that chemists must give up hopes of its existence. The last paper is on a new synthesis of acetic acid by means of acetylene. The author has discovered several processes which effect this transformation. The last method is by digesting acetylenic dichloride with alcoholic or aqueous solution of potassic hydrate, when potassic acetate and chloride are formed. Acetylenic tetrachloride with alcoholic potash at 100° gives glycolic acid, and with aqueous potash at 230° oxalic acid.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 19.—"Spectroscopic Observations of the Sun." No. VI. By J. Norman Lockyer, F.R.S.

The weather has lately been fine enough and the sun high enough, during my available observation-time, to enable me to resume work. The crop of new facts is not very large, not so large as it would have been had I been working with a strip of the sun, say fifty miles or a hundred miles wide, instead of one considerably over 1,000—indeed, nearer 2,000 in width; but in addition to the new facts obtained, I have very largely strengthened my former observations, so that the many hours I have spent in watching phenomena, now perfectly familiar to me, have not been absolutely lost.

The negative results which Dr. Frankland and myself have obtained in our laboratory-work in the matter of the yellow bright line, near D, in the spectrum of the chromosphere being a hydrogen line, led me to make a special series of observations on that line, with a view of differentiating it, if possible, from the line C.

It had been remarked, some time ago, by Prof. Zollner, that the yellow line was often less high in a prominence than the C line; this, however, is no evidence (bearing in mind our results with regard to magnesium). The proofs I have now to lay before the Royal Society are of a different order, and are, I take it, conclusive:—

1. With a tangential slit I have seen the yellow line bright below the chromosphere, while the C line has been dark; the two lines being in the same field of view.

2. In the case of a bright prominence over a spot on the disc, the C and F lines have been seen bright, while the yellow line has been invisible.

3. In a high-pressure injection of hydrogen, the motion indicated by change of wave-length has been less in the case of the yellow line than in the case of C and F.

4. In a similar quiescent injection the pressure indicated has been less.

5. In one case the C line was seen long and unbroken, while the yellow line was equally long, but broken.

The circumstance that this line is so rarely seen dark upon the sun makes me suspect a connection between it and the line at 5015 Angström, which is also a bright line, and often is seen bright in the chromosphere, and then higher than the sodium and magnesium lines, when they are visible at the same time; and the question arises, must we not attribute these lines to a substance which exists at a higher temperature than those mixed with it, and to one of very great levity? for its absorption-line remains invisible, as a rule, in spot-spectra.

I have been able to make a series of observations on the fine spot which was visible when I commenced them on April 10th, not far from the centre of its path over the disc. At this time, the spot, as I judged by the almost entire absence of indications of general absorption in the penumbral regions, was shallow, and this has happened to many of the spots seen lately. A few hours' observation showed that it was getting deeper apparently, and that the umbræ were enlarging and increasing in number, as if a general down-sinking were taking place; but clouds came over, and the observations were interrupted.

By the next day (April 11) the spot had certainly developed, and now there was a magnificently bright prominence, completely over the darkest mass of umbra, the prominence being fed from the penumbra or very close to it, a fact indicated by greater brilliancy than in the bright C and F lines.

April 12. The prominence was persistent.

April 15. Spot nearing the limb, prominence still persistent over spot. At eleven I saw no prominence of importance on the limb, but about an hour afterwards I was absolutely startled by a prominence not, I think, depending upon the spot I have referred to, but certainly near it, more than 2′ high, showing a tremendous motion towards the eye. There were light clouds, which reflected to me the solar spectrum, and I therefore saw the black C line at the same time. The prominence C line (on which changes of wave-length are not so well visible as in the F line) was only coincident with the absorption-line for a few seconds of arc!

Ten minutes afterwards the thickness of the line towards the right was all the indication of motion I got. In another ten minutes the bright and dark lines were coincident.

And shortly afterwards what motion there was was towards the red!

I pointed out to the Royal Society, now more than a year ago,* that the largest prominences, as seen at any one time, are not necessarily those in which either the intensest action or the most rapid change is going on. From the observations made on this and the following day, I think that we may divide prominences into two classes:—

1. Those in which great action is going on, lower vapours being injected; in the majority of cases these are not high, they last only a short time—are throbs, and are often renewed, and are not seen so frequently near the sun's poles as near the equator. They often accompany spots, but are not limited to them. These are the intensely bright prominences of the American photographs.

2. Those which are perfectly tranquil, so far as wave-length evidence goes. They are often high, are persistent, and not very bright. These do not, as a rule, accompany spots. These

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* Proc. Roy. Soc. 1869, p. 354, Mar. 17.

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